

Environmental Studies Program: Studies Development Plan FY 2016-2018

Study Area(s): Western Gulf of Mexico

Administered By: Gulf of Mexico OCS Region

Title: Long-Term Coral Reef Monitoring at the Flower Garden Banks, Gulf of Mexico: 2016-2018

BOEM Information Need(s) to be Addressed: NOAA and BOEM will continue the ongoing financial partnership to support the Long-Term Coral Reef Monitoring Program within the Flower Garden Banks National Marine Sanctuary (FGBNMS). The monitoring protocol shall be consistent with past BOEM contracts for monitoring the coral reefs of the East and West Flower Garden Banks (FGB). The primary objective of this study is to assess the health and vitality of the coral reefs and to provide an analysis of the status of coral reefs in comparison with historical data. This information will be utilized by BOEM and NOAA to design management policies minimizing impacts to coral reefs from offshore oil and gas activities, as well as other factors. This program will be carried out as a collaborative partnership.

Approx. Cost: (in thousands) \$370

Period of Performance: FY 2016-2018

Description:

Background: The coral reefs of the East and West FGB are well documented to be among the healthiest in the western Atlantic and Caribbean region. While many coral reefs have experienced significant declines in coral cover and vitality, the reefs of the FGB remain in relatively stable condition. Coral reefs are focal points for marine biodiversity, provide critical habitat for a variety of fish and invertebrate species of commercial and recreational importance, supply valuable public recreational opportunities, and contribute to local and regional economies. The health of coral reefs may be threatened by a number of potential sources, including direct and indirect impacts from human activities. Due to concern about potential impacts of offshore oil and gas development, DOI (through the Minerals Management Service – now BOEM) started monitoring the East and West FGB in 1988 to assess the health of the coral reefs to establish baseline data and determine if these reefs were impacted by nearby OCS exploration and production activities.

This study is designed to monitor environmental conditions of the coral reefs at the East and West FGB located within the FGBNMS (or Sanctuary). The biological health of the coral reef community shall be monitored to detect any significant effects from natural and/or human-induced activities that could potentially endanger the coral community integrity. Surveys at both the East and West FGB shall be performed over a two-year period. Annual 5-day data collecting cruises on each bank shall be conducted during late summer or early fall (generally August or September) each year of the agreement.

Objectives: The objectives for this long-term monitoring effort is designed to assess the health of the coral reefs, through the evaluation of changes in living coral and other benthic community cover, coral growth rates, reef fish population dynamics, water quality and other indices of reef vitality. This program is of significant interest to both NOAA and BOEM, whom share responsibility to protect and monitor these important marine resources.

Methods: Observations shall be made to evaluate coral reef diversity, growth rates, and long-term changes in individual coral colonies, accretionary growth, and general coral reef community health during years 2016 and 2017. In general, survey techniques are listed and described in detail in monitoring reports from previous reporting periods (*Long-term Monitoring at the East and West Flower Garden Banks 2011-2012* (IA No. Mo9PG00011). The following is a summary of the current monitoring methods that will be continued within each study site:

- a) Sixteen (16) photographic transects ten (10) meters in length shall be taken in a stratified random manner with four (4) transects randomly located in each quadrant of each study site. Starting points of transects within study sites shall be randomly located using statistically valid methods.
- b) Forty (40) repetitive quadrat stations shall be maintained in each study site to detect and evaluate long-term changes in individual coral colonies. Eleven (11) repetitive quadrat stations at the East FGB and twelve (12) repetitive quadrat stations at the West FGB shall also be maintained at depths between 100 and 130 feet.
- c) Thirty (30) permanent stations for monitoring growth of the scleractinian coral *Psuedodiploria strigosa* shall be maintained in each study area.
- d) Cores of *Orbicella faveolata* coral colonies shall be taken on each bank during the second sampling cruise.
- e) A minimum of two (2) videotaped transects of 100 m length shall be flown at each site to show the general conditions of the coral and to help document the condition of certain individual coral heads and other features for future reference.
- f) Fish counts shall be performed at both banks using both the Reef Visual Census (RVC) (Bohnsack & Bannerot, 1986) stationary visual technique and belt transect technique (NOAA, Center for Coastal Monitoring and Assessment) for quantitatively assessing community structure of coral reef fishes.
- g) Eight (8) of the 16 random transects mentioned in requirement a), will be utilized to conduct coral recruit and colony size surveys.
- h) *Diadema antillarum* (long spined urchin) surveys shall be conducted to establish current population levels as a basis for comparison with future observations.
- i) In addition to *Diadema antillarum* surveys, *Panulirus argus* (spiny lobster), *Panulirus guttatus* (spotted lobster), and *Pterois volitans* (lionfish) surveys shall be conducted in conjunction with *Diadema antillarum* surveys along study site boundary lines.
- j) Water quality instruments deployed long-term in the field shall be serviced and all data downloaded at least four times each year at approximate three-month intervals.
- k) A minimum of three (3) water samples shall be collected quarterly at both banks at the surface, mid-water, and near bottom using a vertical 10 liter sampling bottle and analyzed for chl *a*, ammonia, nitrate, nitrite, TKN, and phosphorous. The samples shall be analyzed by an approved EPA certified laboratory.

Current Status: 2017 monitoring is currently ongoing. Four surveys are scheduled for the 2017 season.

Annual Report Due: July 2018

Affiliated WWW Sites: <http://flowergarden.noaa.gov/>

Revised Date: March 16, 2018